Space Weather Forecast

Issued on Monday, 21 August 2023 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of Moderate class flares (R1-R2; Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Low, with the peak flare a low-mid level Common-class event at 20/0626 UTC from a very small sunspot in the northwest. Background X-ray flux otherwise remains subdued, but is now increasing as a large sunspot group is rotating over the eastern horizon in the northern hemisphere. There are seven sunspot regions on the facing side of the Sun, however there has been little overall change in the sunspots which were generally magnetically simple and stable.

No Earth-directed Coronal Mass Ejections (CMEs) were observed during the period.

Solar Wind / Geomagnetic Activity: The solar wind at Earth started at Elevated levels around 500-550km/s, but has increased during the period to reach 600-670km/s (Strong) with a peak of 690 km/s noted at 20/1200 UTC. This is now thought to be due to the influence of a previously unidentified trans-equatorial coronal hole currently located around 50W. The associated magnetic field was Weak to Moderate at the start of the period, but has since become predominantly Weak with only very brief increases to Moderate. The important north-south component varied between Moderately positive and Weakly negative. The net result of the above solar wind measures was for Quiet to Unsettled geomagnetic activity (Kp1-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar Activity is expected to be mainly Low, but with a Chance of isolated Moderate-class flares. There is a greater chance of activity this week compared to last with the arrival of some far-sided regions, which includes a previously active sunspot that was responsible for a Strong flare on 05 August.

Solar Wind / Geomagnetic Activity: Solar winds are currently enhanced (to Strong levels) by a previously unidentified coronal hole in the western hemisphere. The connection to this feature should ease in the next couple of days (to Elevated or Slightly Elevated levels) before the arrival of another coronal hole high-speed stream (HSS) on Day 3 (23 August) likely increases speeds to more persistently Elevated levels once again. This feature then probably eases on Day 4 (24 August). No Earth-directed CMEs feature in the forecast.

Geomagnetic activity is forecast to be mostly Quiet to Unsettled (Kp1-3) throughout, but on Day 1 (21 August) and also Day 3 there is the Chance for isolated Active intervals and a non-zero risk of a G1/Minor Storm period should there be any protracted period of southward directed magnetic field of the solar wind on these days.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	2	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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